ADAM-3600-C2G2G iRTU

User's Manual

Version 0.7

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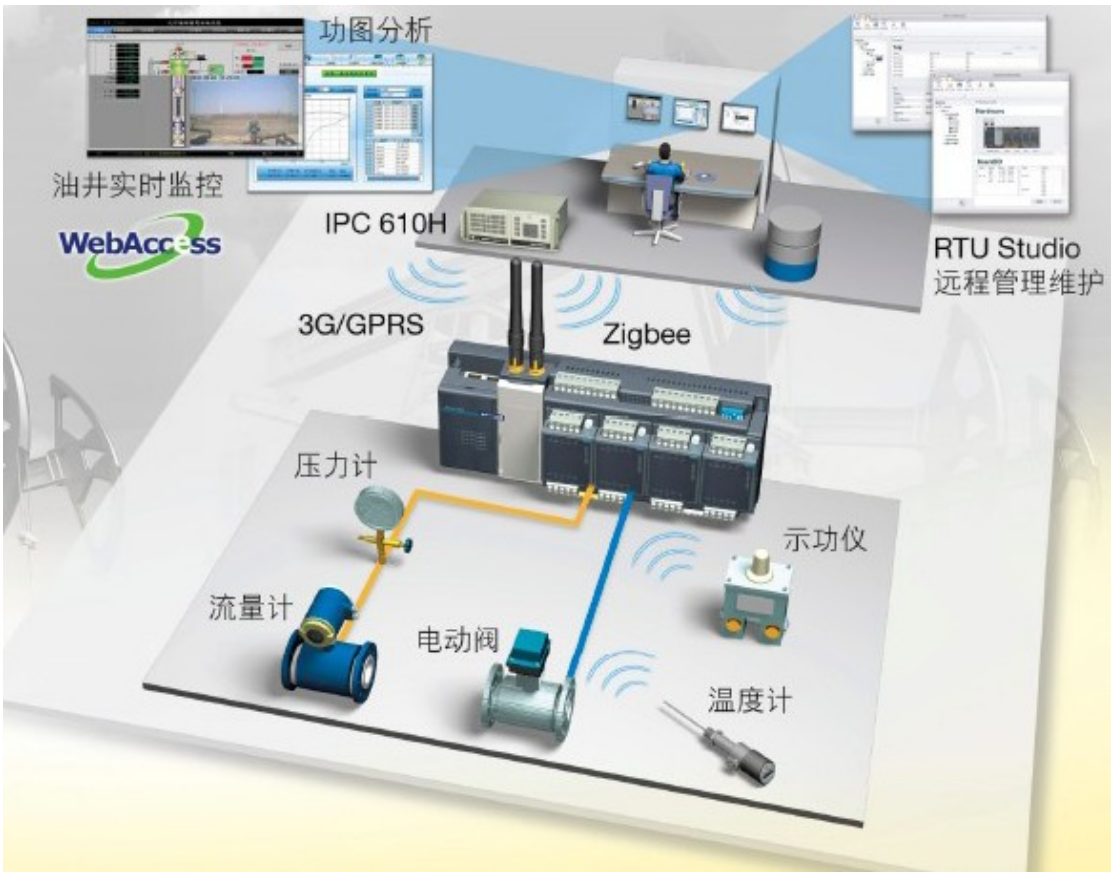
Chapter 1 Introduction

1-1 Product Concept &Target Market

ADAM-3600-C2G is an Intelligent Remote Terminal Unit / iRTU ,mainly applied to oil-gas-water industries. Intelligent network nodes in loT can control the downstream field devices to complete delivery tasks, transfer data to upstream devices wired or wirelessly. It is key to connecting devices to the Internet of things architecture.

In the remote and wide ranging oil, gas and water application site maintenance and updating equipment is extremely costly. Intelligent RTU can perform remote monitoring, operation, maintenance and updates via the Internet. iRTU can perform up-date, complete delivery tasks at the site, and update data to the cloud. iRTU can also communicate with each other, quickly handle I/O correlation on emergencies to reduce the loss

The ADAM-3600 has a high performance and low power processor, adopts 20 local I/O points and wired and wireless communication modes, users can collect, process and distribute the local information. It has a built-in real-time operating system and a real-time database, providing customers with an open interface and supports diverse programming languages.



Picture 1.1 iRTU Application Architecture

Chapter 2 Specifications

2-1 Product Key Features

- **Wireless communication for high-efficient transmission**

RTU is usually applied to a wide range of monitoring, such as oil field or oil pipelines. In wide area environments, wired communication often has cost and maintenance problems. The ADAM-3600-C2G series built-in two Mini-PCIe cards slots and can support two types of different wireless communication interfaces. The supported wireless communication functions include: GPRS, 3G, Wi-Fi and Zigbee, users have

many choices in the application of wireless communication, and are not restricted by field conditions.

- **High performance and low-power CPU/RAM**

ADAM-3600-C2G is with 32-bit Cortex A8 600MHz CPU and DDR3 memory chips, which greatly improve the processing speed and efficiency. Based on these advantages and its unique low-power design, customers could take their time to tackle the complex logic program.

- **Wide range of operation temperature with durability in harsh environment and reducing maintenance costs**

It can be used for outdoor control cabinets and therefore must be able to withstand the heat of summer and the cold of winter. The ADAM-3600 supports an operating temperature range of - 40℃ ～ 70℃. The selected components are industrial grade, and have been tested with the strictest environmental control, to ensure that the products have a long life and, stable working in harsh environments.

- **Convenient remote project configuration software iRTU Studio**

Provides project configuration software with remote operation. Users can configure all the devices in an offline and group mode, and can automatically conduct remote downloading based on its own code. Users can use this software for remote monitoring, updating the programmable logic and firmware, to save the cost of manpower and materials.

- **Supports open communication protocols**

In addition to the standard Modbus communication protocol, it also supports the object DNP3 protocol. DNP3 is an international standard for RTU applications, and can also realize data identification, breakpoint transmission, initiative report and other functions under this protocol user can quickly integrate most of the SCADA system.

- **Multiple programming interfaces**

Adopt an open real-time Linux system architecture, and run the real-time database. Transmission gives priority to the customizable tag. Data with a simple configuration can be converted instantly within the different communication protocols. And provide the IEC - 61131-3 standard & C/C + + library for the customer to develop programs. This lets users develop programmable logic control in the most convenient way.

- **NodeID as identification facilitate remote batch configuration**

ADAM-3600 has a six bit DIP-switch on board which can be identification for 64

devices on the field. Through an ordinary cable, it could download configuration documents into RTU devices (with a maximum of 64), and customers could find out the sources of faults through ID codes when variations encountered in the performance of RTU.

■ **Intelligent communication condition monitoring software iCDManager**

Communication is the key function of RTU applications. RTU hardware can monitor the health status of the hardware communication. Users can use the intelligent algorithm to identify the health status of communications lines, remotely monitor the communication quality through the network in group mode, conduct the maintenance in advance, so as to avoid emergency repair caused by temporary failure.

2-2 ADAM-3600-C2G Specification

2-2-1 ADAM-3600-C2G Specification of Main Unit

2-2-1-1 System Specification

CPU	A8 AM3352BZCZD60	
RAM	DDR3 256MB	
Battery Backup RAM	32KB	
Power Requirement	9-36VDC	
Digital Input/ Pulse In	8-ch	
Digital Output/ Pulse Output	4-ch	
Analogue Input	8-ch	
Extension I/O Slot	4-Slot	
Serial Port	2xRS-485	
	1xRS-232/485(DB9)	
Wireless	Interface	2* Mini-PCIe (1*Half-Size/ 1*Full-Size)
	Zigbee	Serial Signal
	GPRS/3G/Wifi	USB Signal
USB	1xUSB2.0	
Ethernet	2x RJ-45	
Display	1x VGA	
LEDs	DI/DO/System/Serial Port/LAN	
SD Card	Standard SD (For Data Storage)	
	Micro SD(1GB For OS Storage)	

Operation Temperature	-40~70 °C
Storage Temperature	-40~85°C

2-2-1-2 Input / Output Specification

Analog Input	
Channel	8 , differential
Input Type	Voltage, Current
Voltage/Current Range	±10V, ±2.5V, 0~20mA, 4~20 mA
Resolution	16-bit
Sampling rate	10 samples/second (total)
Input Impedance	10MΩ
Accuracy	±0.1% or better(Full Scale)
CMR @ 50/60 Hz	120 dB
NMR @ 50/60 Hz	100 dB
Span Drift	± 25 ppm/℃
Zero Drift	± 3 μV/℃,± 3 μA/℃
Isolation Voltage	2000VDC
Burn-out detection	Yes（Current-only）

Digital Input/Pulse Input	
Channel	8
Input Type	Sink(Wet Contact)/ Counter
Wet Contact Input	Logic0 : 0 ~ 5 VDC Logic 1: 11~30VDC
Rated Voltage	12/24VDC
Rated Input Current	>5mA@12VDC >10mA@24VDC
Input Filter	Programmable, Default: 3ms
Pulse Input Frequency	150HZ
Over Voltage Protection	+40VDC
Isolation Voltage	2000VDC

Digital Output/Pulse Output		
Channel	4	
Output Type	Open Collector（Sink）	
OC Output	Rated Voltage	8~30 VDC
	Rated Current	200mA(max.load)
Over Voltage Protection	+40VDC	
Pulse Output Frequency	1KHz	
Isolation Voltage	2000VDC	

2-2-1-3 Environmental Specification

- Operating Temperature: -40~70°C
- Storage Temperature: -40~85°C
- Operating Humidity: 20~95% (non-condensing)
- Storage Humidity: 0 ~ 95% (non-condensing)

2-2-2 Expansion Module Specification

ADAM-3600-C2G support four slots expansion can support different type IO modules in one integrated unit.

2-2-2-1 ADAM-3617 (4-ch AI)

ADAM-3617	
Channel	4 , differential
Input Type	Voltage, Current
Voltage/Current Range	±10V, ±2.5V, 0~20mA, 4~20 mA
Resolution	16-bit
Sampling rate	10 samples/second (total)
Input Impedance	10MΩ
Accuracy	±0.1% or better(Full Scale)
CMR @ 50/60 Hz	120 dB
NMR @ 50/60 Hz	100 dB
Span Drift	± 25 ppm/°C
Zero Drift	± 3 μV/°C± 3 μA/°C
Isolation Voltage	2000VDC
Burn-out detection	Yes（Current-only）

2-2-2-2 ADAM-3618 (4-ch Thermocouple)

ADAM-3618	
Channel	4 , differential
Input Type	J,K,T,E,R,S,B Type Thermocouple
Resolution	16-bit
Sampling rate	10 samples/second (total)
Input Impedance	2MΩ
Accuracy	±0.1% or better(Full Scale)
CMR @ 50/60 Hz	90dBs
NMR @ 50/60 Hz	60dBs

Span Drift	± 25 ppm/℃
Zero Drift	± 3 μV/℃
Isolation Voltage	2000VDC
Burn-out detection	Yes（Current-only）

2-2-2-3 ADAM-3622 (2-ch AO)

ADAM-3622	
Channel	2
Output Type	Voltage, Current
Output Range	0 ~ 10 VDC, 0~20 mA, 4~20 mA
Resolution	12-bit
Accuary	±0.1% or better(Full Scale)
Current Load Resistor	0 ~ 500
Span Drift	± 25 ppm/℃
Zero Drift	± 3 μV/℃
Isolation Voltage	2000VDC
Burn-out detection	Yes（Current-only）

2-2-2-4 ADAM-3651 (8-ch DI/ PI)

ADAM-3651	
Channel	8
Input Type	Sink(Wet Contact)/ Counter
Wet Contact Input	Logic0 : 0 ~ 5 VDC Logic 1: 11~30VDC
Rated Voltage	12/24VDC
Rated Input Current	>5mA@12VDC >10mA@24VDC
Input Filter	Programmable, Default: 3ms
Pulse Input Frequency	150HZ
Over Voltage Protection	+40VDC

2-2-2-5 ADAM-3656 (8-ch DO/ PO)

ADAM-3656		
Channel	8	
Output Type	Open Collector（Sink）	
OC Output	Rated Voltage	8~30 VDC
	Rated Current	200mA(max.load)

Over Voltage Protection	+40VDC
Pulse Output Frequency	1KHz
Isolation Voltage	2000VDC

2-2-2-6 ADAM-3664 (4-ch RO)

ADAM-3656		
Channel	4	
Output Type	Open Collector（Sink）	
OC Output	Rated Voltage	8~30 VDC
	Rated Current	200mA(max.load)
Over Voltage Protection	+40VDC	
Pulse Output Frequency	1KHz	
Isolation Voltage	2000VDC	

2-3 LED Indicator

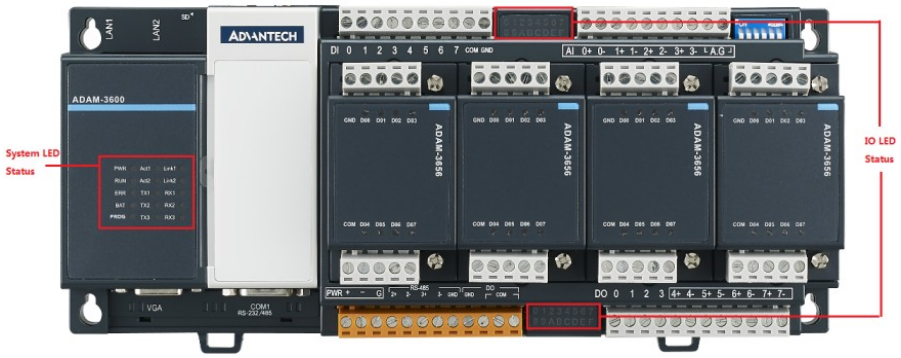


Figure 2.3 LED Indicator

2-3-1 System LED

LED	Color	Function Description
PWR	Green	Light on, Device powered
RUN	Green	Blinking, Normal Operation (control by user's program or Softlogic)
ERR	Red	Light on, System failure (control by user's program or Softlogic)
BAT	Red	Light on, battery lower than 5V
PROG	Green	Control by user's program

2-3-2 Digital Input/Output Indicator LED

LED	Color	Function Description
DI0	Green	Light on，the channel is activated by input signal
DI1	Green	
DI2	Green	
DI3	Green	
DI4	Green	
DI5	Green	
DI6	Green	
DI7	Green	
DO0	Green	Light on，the channel output is activated
DO1	Green	
DO2	Green	
DO3	Green	

2-3-3 Serial Communication LED

LED	Color	Function Description
TX1	Orange	Blinking，COM1is sending data
RX1	Green	Blinking，COM1is receiving data
TX2	Orange	Blinking，COM2is sending data
RX2	Green	Blinking，COM2is receiving data
TX3	Orange	Blinking，COM3is sending data
RX3	Green	Blinking，COM3is receiving data

2-3-4 Ethernet LED

LED	Color	Function Description
Link1	Orange	Light on, LAN1 is unconnected with Ethernet
Act1	Green	Blinking, LAN1 is sending data to Ethernet
Link2	Orange	Light on, LAN2 is unconnected with Ethernet

Act2	Green	Blinking, LAN2 is sending data to Ethernet

2-4 Dimensional Drawing

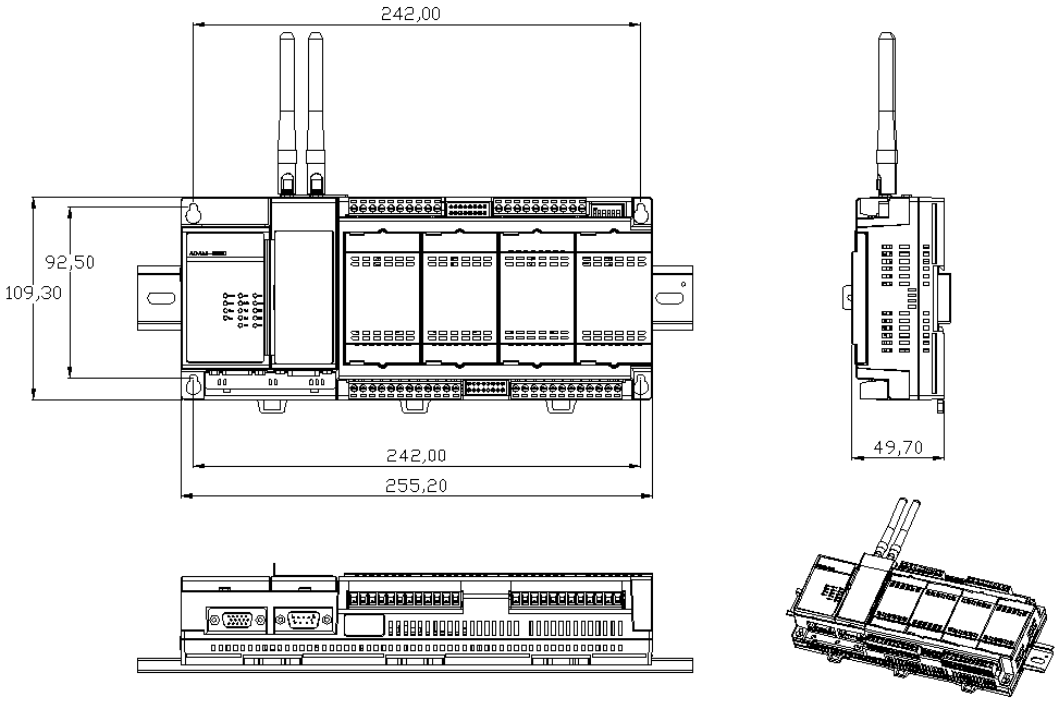


Figure 2.4 Mechanical Drawing

Chapter 3 Wiring and Installation

3-1 Wiring

3-1-1 Power Supply Wiring

ADAM-3600-C2G supports mains input ranging from 10VDC to 30VDC. Users can choose standard 12VDC or 24VDC power supply.

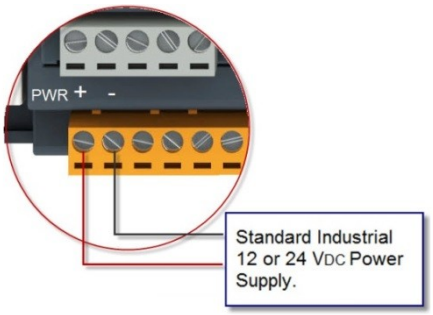


Figure 3.1.1 Power Supply Wiring

3-1-2 Input / Output Wiring

3-1-2-1 Analog Input Wiring

ADAM-3600-C2G equips with 8 channels AI with differential wiring type, wire as shown below:

Figure 3.1.2.1 Analog Input Wiring

3-1-2-2 Digital Input Wiring

ADAM-3600-C2G equips with 8 channels DI, please follow below diagram for wiring.
The pin “COM” is for positive voltage wiring and provides a pull high voltage to the unwired pins. Normally user can leave it empty, and consider wiring while the field interference is significant.

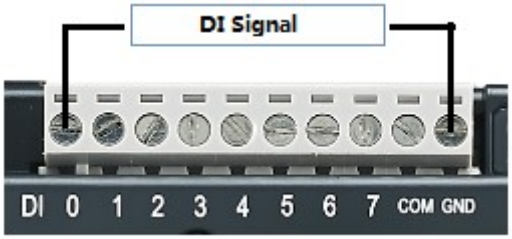


Figure 3.1.2.2 Digital Input Wiring

3-1-2-3 Digital Output Wiring

ADAM-3600-C2G equips 4 channels DO, follow below diagram for wiring

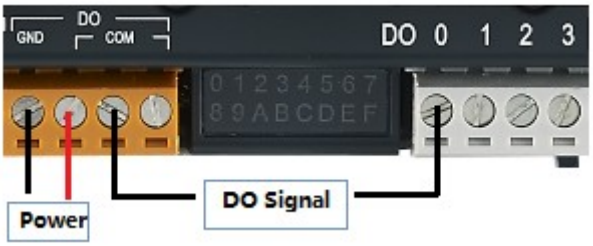


Figure 3.1.2.3 Digital Output Wiring

3-1-3 Serial Port Wiring

ADAM-3600-C2G equips with 3 serial ports, the COM2/3 are for RS-485 and locate on the orange terminal, please follow the below diagram for wiring:

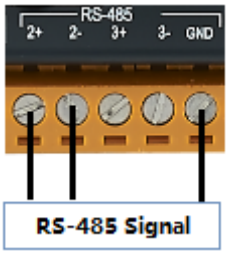


Figure 3.1.3 Serial Port Wiring

3-2 Installation

3-2-1 Wall-mounted and DIN-Rail Installation

ADAM-3600-C2G supports two types of installation: Wall-mounted and DIN-Rail Installation

For the wall-mounted installation, users can fix the device on the wall with 4 screws as shown below.

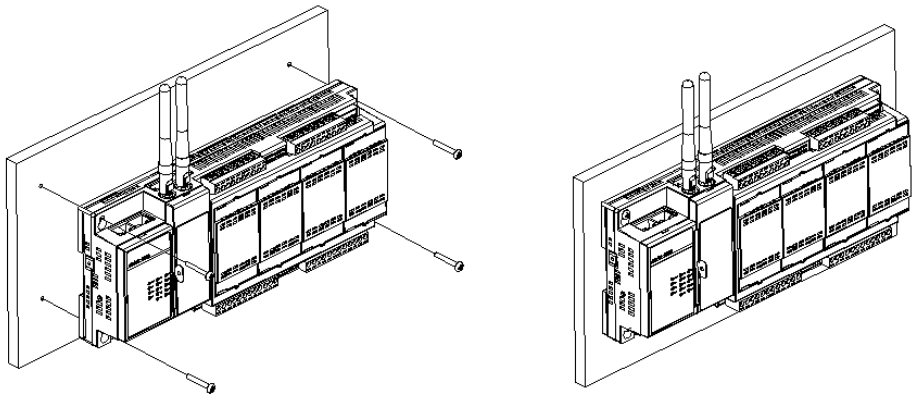


Figure 3.2.1(1) Wall-mounted Installation

For DIN-Rail installation, please follow below diagram to put the device on the DIN-Rail, and lock the 3 lock to fix the device on the DIN-Rail

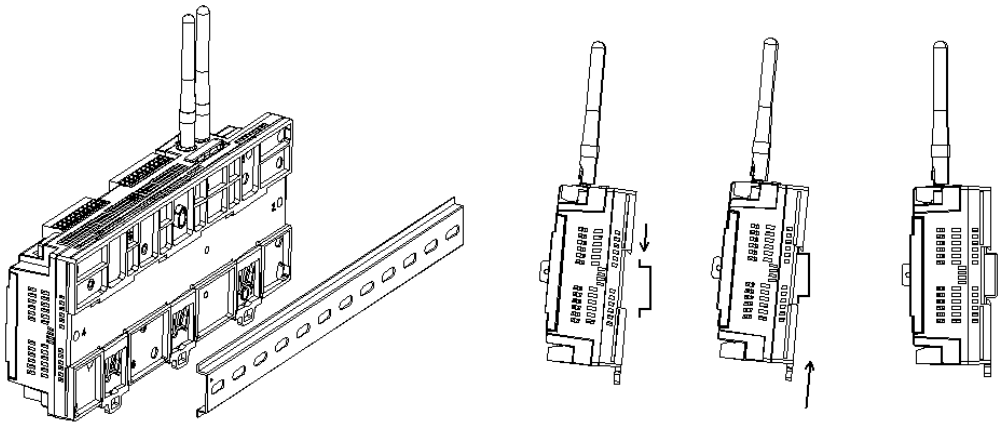


Figure 3.2.1(1) DIN-Rail Installation

3-2-2 Wireless Module Installation

There are two wireless expansion interfaces under the gray cover, which support two Mini-PCIe ports, and can insert wireless LAN card. Two network cards can be installed in a overlapped way. The below supports half-sized card while the upper supports full-size card. Two screws are needed to install each card, and then the antenna could be installed. More details as follows:

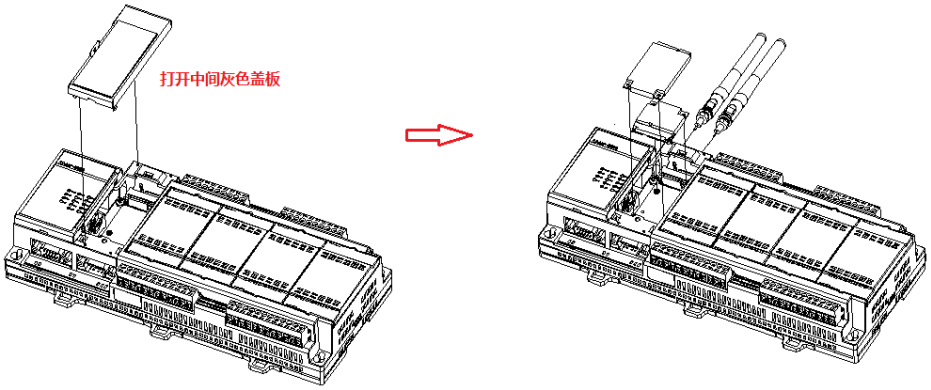


Figure 3.2.2 Wireless Module Installation

3-2-3 Expansion Input/Output Module Installation

ADAM-3600-C2G has four expansion slots named A, B, C and D with a black cover. The following is the installation methods when customers need to plug expansion modules.

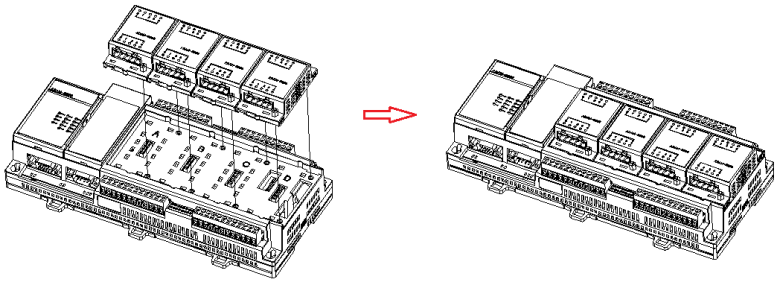


Figure3.2.3(1) Expansion Input/Output Module Installation

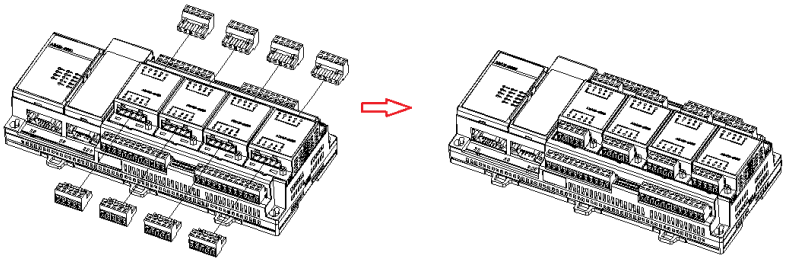


Figure3.2.3 (2) Expansion Input/Output Module Installation

3-2-4 Writeable Label

To make it more convenient for users to record RTU device information, we especially design a writeable label on the cover. User can write any information to help to keep some important project information.

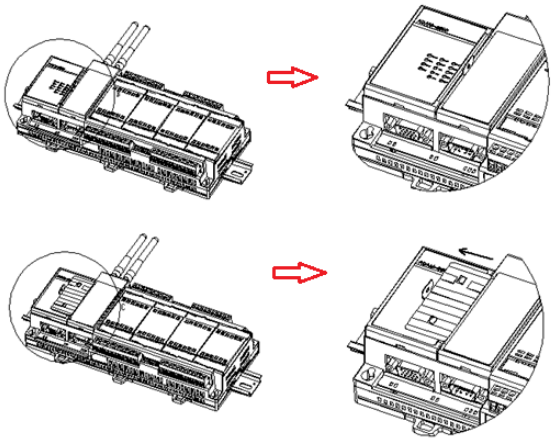


Figure 3.2.4 Writeable Lable

3-2-5 SD Card Installation

ADAM-3600-C2G supports two types of SD cards used as storage. One is Micro-SD, which carry the OS. The other is Standard SD for storing data. It is available for users to choose and configure. The installation location of Standard SD is at the bottom of the antenna, poke the black blade upward, and you will find the slot, insert the SD card, poke the black blade downward as follows:

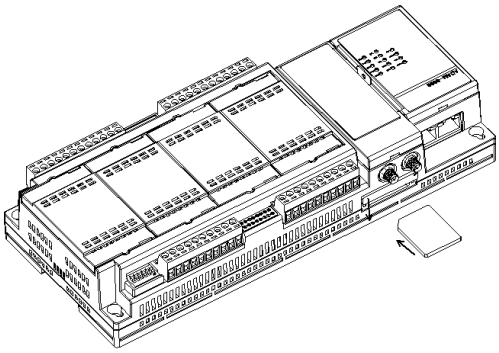


Figure 3.2.5 Card Installation

3-2-6 SIM Card Installation

When customers install a 3G/GPRS module, they need to insert a SIM card, please follow below diagram to install the SIM card. The SIM card is micro-SIM (3FF) type.

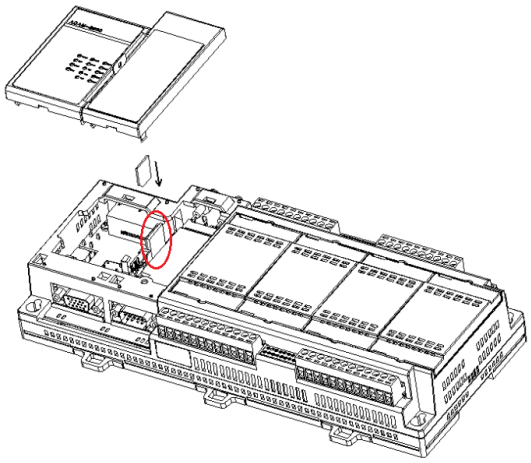


Figure 3.2.6 SIM Card Installation

3-3 Jumper/Switch Settings

3-3-1 DIP Switch Settings

ADAM-3600-C2G IO has two DIP switches as follows:

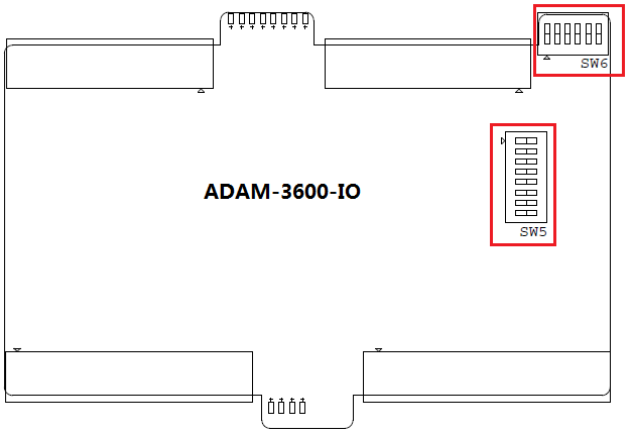


Figure 3.3.1 DIP Switch Setting

ADAM-3600 DIP Switch Setting			
No.	Name	Meaning	Description
1	SW6	Node ID	6-bit，support 0~63 devices ON-1/ OFF-0 1 is for high bit, 6 is for last bit, ex: [0 0 0 0 0 1] = 1 [1 0 0 0 0 0] = 32
2	SW5	8-ch AI Current or voltage range select	ON- Current OFF- Voltage

3-3-2 Jumper Setting

ADAM-3600 CPU has two Jumpers as follows:

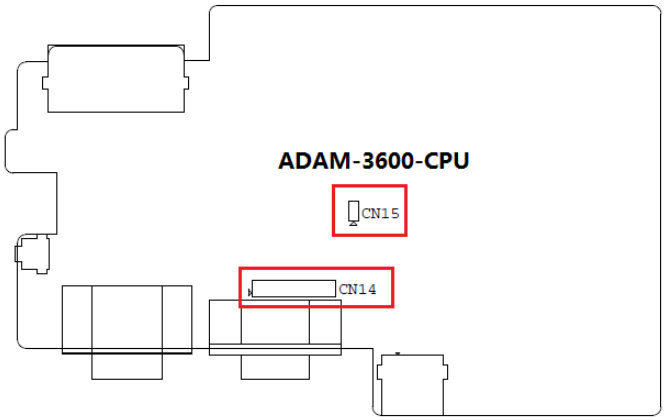
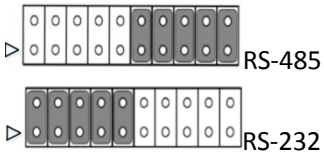


Figure 3.3.2 Jumper Setting

ADAM-3600 Jumper Setting			
No.	Name	Meaning	Descriptions
1	CN14	COM1 DB9 Port select RS-232 or RS-485	
2	CN15	Watchdog Enable Jumper	ON- Enable OFF- Disable

Appendix A ADAM-3600 Naming Rules

ADAM-3600 includes two types of products that are ADAM-3600-A1F and ADAM-3600-C2G, which shows a great difference as far as their design and features. In this Manual, we focus on the introductions of ADAM-3600-C2G

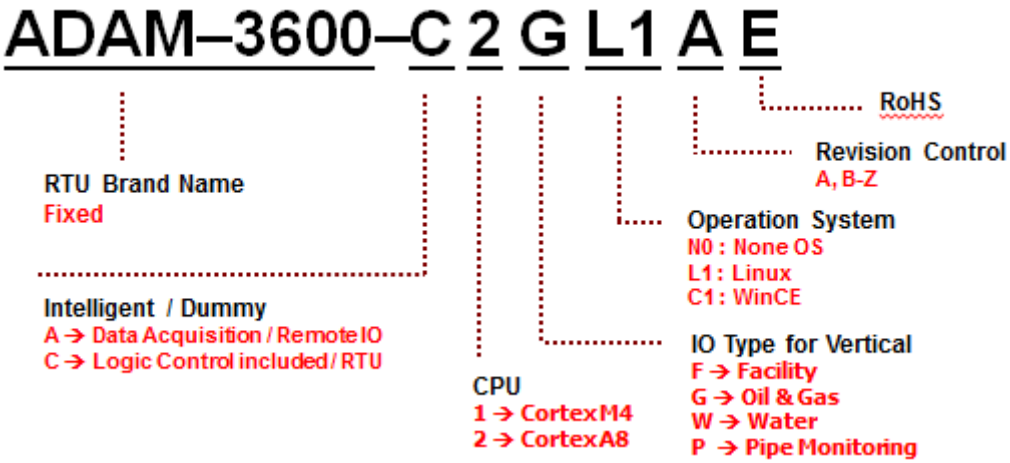


Figure ADAM-3600 Naming Rules

Examples：

ADAM-3600-C2GL1AE : Cortex A8 iRTU for Oil&Gas (C Series)

ADAM-3600-A1FN0AE : Cortex M4 Remote IO for Facility Monitoring (A Series)

Appendix B Interface Definition

- ## Communication Port

- **COM 1: RS-232/RS-485**

  Connection: DB-9
  Baud rate: 1200~115.2k bps
  RS232 signals: RxD, TxD, GND, RTS, CTS
  RS485 signals: DATA+, DATA-

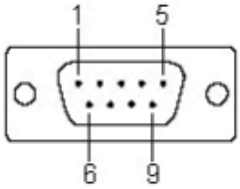


Figure DB9 Serial Port

PIN	RS-232 Signal
1	N/C
2	RXD
3	TXD
4	N/C
5	GND
6	N/C
7	RTS
8	CTS
9	N/C
PIN	**RS-485 Signal**
1	DATA+
2	DATA-
3	N/C
4	N/C

- **COM 2&COM3: RS-485**

  Connection: Terminal Block
  Baud rate: 1200~921.6k bps
  RS-485 signals: DATA+, DATA-
  Communication Isolation： 2000Vdc

PIN	RS-485 Signal
1	DATA2+
2	DATA2-
3	DATA3+
4	DATA3-

- **USB Port:**

  Connection: USB 2.0 1800 connect

  USB signals: Vcc, Data-, Data+, GND

Figure USB Serial Port

PIN	USB Signal
1	VCC
2	Data-
3	Data+
4	GND

- **LAN1 and LAN2: Ethernet Port**

  Connection: RJ-45 Base-T 1800 connect

  Transfer rate: 10/100Mbps

  LAN signals: TD+, TD-, RD+, RD-

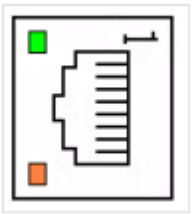


Figure: Ethernet Port

PIN	Signal
1	TD+
2	TD-
3	RD+
4	N/C
5	N/C
6	RD-
7	N/C
8	N/C

- **IO Interface Definition**

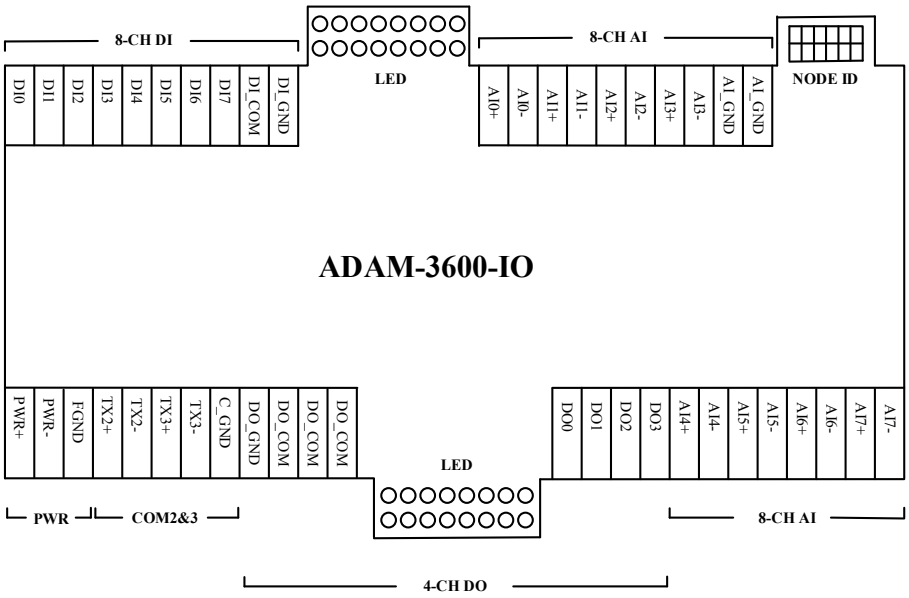


Figure IO Interface Definition